UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/932,810	08/20/2001	Noriyuki Funakubo	WATA.0007	6912

38327	7590	10/24/2005

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EXAMINER
LAY, MICHELLE K

ART UNIT	PAPER NUMBER
2672	

DATE MAILED: 10/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/932,810	FUNAKUBO ET AL.
	Examiner	Art Unit	
	Michelle K. Lay	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>*06 July 2005*</u>.

2a) ☒ This action is **FINAL.** 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>*1-84*</u> is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>*1-84*</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☒ All b)☐ Some * c)☐ None of:

       1.☐ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____.

       3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
     Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

DETAILED ACTION

Response to Amendment

The amendment filed on 06 July 2005, has been entered and made of record. The 35

U.S.C. 112, second paragraph rejection of claims 15-20 and 57-62 are withdrawn.

Claims 1-84 are pending.

Response to Arguments

Applicant's arguments filed 06 July 2005 have been fully considered but they are

not persuasive.

Applicant argues Evangelisti et al. (US Patent No. 5,392,385) in view of Donovan

(US Patent No. 6,005,580) fails to disclose or suggest performing anti-aliasing

processing and drawing processing at the same time as in the Applicant's invention

where the intensity value calculation processing is performed while simultaneously

performing the line intersection data calculation processing based on vertex coordinates

when a polygon is about to be drawn using the vertex coordinates [*Applicant's

Remarks*, pp. 42-43}. Examiner respectfully disagrees. Independent claims 1, 9, 10,

11, 23, 24, 43, 51, 52, 53, 65, and 66 as rejected in view of Evangelisti et al. (US Patent

No. 5,392,385) in view of Donovan (US Patent No. 6,005,580) fails to claim the intensity

value calculation processing is performed while simultaneously performing the line

intersection data calculation processing. Instead, the claims disclose "an edge

calculating device which calculates line intersection data ..." and then further discloses

"a scan line processing device which *sequentially* calculates the intensity value ..."

(emphasis added). The use of the word "sequentially" does not imply that the

calculation of the line intersection is performed simultaneously with the calculation of the

intensity value, but rather one after another.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1.   Claims 1, 2, 5, 6, 9-12, 23, 24, 43, 44, 47, 48, 51-54, 65, and 66 are rejected

under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,392,385 to

Evangelisti et al. in view of U.S. Patent No. 6,005,580 to Donovan.

Claims 1, 9-11, 23, 24, 43, 51-53, 65, and 66 are taught by Evangelisti et al.

Evangelisti et al. discloses an invention that draws a polygon using an anti-aliasing

method that includes an edge-calculating device. Evangelisti et al. teaches of

surrounding a triangle with a beveled edge and performing anti-aliasing on the beveled

edge using increasing and decreasing intensity values such that the intensity value

increases from the outside to the inside of the beveled edge and decreases from the

inside to the outside of the beveled edge. Figure 4 shows an example of a triangle with

the beveled edge surrounding it. Column 8, lines 65-68, and column 9, lines 1-39,

describe calculating the intensity value to be given to each portion of the polygon based

on the location of the portion being either totally inside or outside the triangle or lying on

an edge of the triangle. Additionally, the example on line 36 of column 9 shows that a

portion inside the triangle receives an anti-aliasing factor of 1. Column 15, lines 65-68,

and column 16, lines 1-7, state, "As one further note to the procedure of FIG. 17, as

stated previously, the anti-aliasing factor (a) may be a 1, a 0, or a fraction, the new color

is a new (n) computed shaded value, the old (0) value in the frame buffer or a fraction of

each. If (a) is a 1, the new pixel value for the pixel just computed is placed unaltered in

the frame buffer, if it is a 0, it is known that the pixel is outside the triangle and the old

value in the frame buffer will be left unaltered; or finally if (a) is a fraction, this fraction is

used to accomplish the anti-aliasing in accordance with the procedure shown in the

figure." Therefore, any portion lying within the triangle being drawn will receive an anti-

aliasing factor of 1, which causes the intensity rate to remain constant inside the

triangle. The invention of Evangelisti et al. also includes performing the anti-aliasing

processing by a parallel algorithm such that the anti-aliasing for a particular block of

pixels is broken down for parallel execution. Column 4, lines 20-32, states, "The

objects of the present invention may be accomplished by an SIMD computer

architecture utilized in conjunction with a host processor and coordinate processor to

render quality, anti-aliased, shaded color images into the frame buffer of a video display

system. The method includes a parallel algorithm for rendering an important graphic

primitive for accomplishing the production of a smoothly shaded color three-dimensional

triangle with anti-aliased edges for display on a two-dimensional display screen. By

taking advantage of the SIMD architecture and said parallel algorithm, the very time-

consuming computations are broken down for parallel execution." Thus, the processing

for calculating changes in the intensity value from the outside portion of the anti-aliasing

area to the inside portion of the area and from the inside area to the outside area are

performed in parallel with each other. Figure 6 shows an apparatus of the invention of

Evangelisti et al. including, memory storage medium and a host and coordinate

processor for performing calculating functions.

Evangelisti does not, however, disclose deriving line intersection data associated

with an intersecting portion between each edge of the polygon to be drawn and each

scan line and sequentially calculating the intensity value to be given to each portion of

the polygon in the scanning direction with respect to said each scan line using vertex

coordinates of the polygon to be drawn. The invention of Donovan includes a raster

display and determining a line intersection between an edge of the polygon and a scan

line. Figures 4A - 4D illustrate the intersection between an edge and a scan line.

Column 7, lines 14 - 23, states, "As shown in step 310, a set of intersection points (x,y)

is identified for each polygon edge in the set of polygon edges selected in step 300.

Each set of intersection points identifies the intersection of the corresponding polygon

edge with the horizontal and vertical scan lines in the output image. The notation (x,y)

is used to refer to the coordinate space for an image to be displayed on a computer

screen. Since texture maps reside in their own coordinate space, the notation (u,v) is

used to refer to the texture coordinate space of a texture map."

It would have been obvious to one having ordinary skill in the art at the time the

invention was made to modify the invention of Evangelisti et al. to include a raster

output device as in Donovan. One would have been motivated to make such a

modification to Evangelisti et al. such that the output display as shown in Figure 6 may

also include older output displays such as a raster output display. It would have further

been obvious to one having ordinary skill in the art at the time the invention was made

to modify the invention of Evangelisti et al. to include deriving line intersection data

associated with an intersecting portion between an edge of the polygon to be drawn and

each scan line as in Donovan. One would have been motivated to make such a

modification to Evangelisti et al. so that each set of intersection points identifies the

intersection of the corresponding polygon edge with the horizontal and vertical scan

lines in the output image as stated by Donovan in column 7, lines 17-19. Additionally, if

the intersection does not exist at a pixel point then processing may be performed to

determine which pixel is considered to contain the intersection point as described by

Donovan in column 10, lines 12 - 16. Column 7, lines 15 - 43, of Donovan describes the

method for sequentially performing calculating intersection points between a polygon

edge and a scan line then performing anti-aliasing functions by a filtering operation.

Lines 44-47 state, "While the invention is described herein as a series of steps (see

Figs. 2, 3, 5, 6), the invention is not limited to serially performing these steps. For

example, many of these steps would be performed in parallel." Thus, Donovan teaches

that the anti-aliasing processing steps may be performed sequentially or in parallel with

each other. It would have been obvious to one having ordinary skill in the and at the

time the invention was made to further modify the invention of Evangelisti et al. to

include sequentially calculating the intensity value to be given to each portion of the

polygon in the scanning direction with respect to each scan line. One would have been

motivated to make such a modification to the invention of Evangelisti et al. so that the

process of Evangelisti can be performed on raster type devices where anti-aliasing is

performed in accordance with each scan line in the scanning direction.

Evangelisti et al. and Donovan as applied to claims 1, 11, 43 and 53 teach of the

apparatus of claims 2, 12, 44, and 54, respectively, except wherein the edge calculating

device comprises means for calculating a first and second pair of positions on lattice

points of displayed grid boxes that are located adjacent to a pair of real intersections

between each scan line and an edge of a polygon. Evangelisti et al. as modified by

Donovan teaches of surrounding a triangle with a bevel region on a raster device. The

scan lines of the device intersect the bevel region, thus producing a pair of inside and

outside intersection points for every instance the scan line crosses the bevel region.

Figures 4A and 4B of Donovan show a polygon edge intersecting a scan line. Column

8, lines 40-51, describe calculating a pair of positions on lattice points that are located

adjacent to a pair of real intersection positions between a scan line and a polygon edge.

"Since the intersection point (x,y) 412 is on the horizontal scan line 400, the value of y is

integral. In contrast, x falls between the integral points 402 and 404. Thus, x has an

integral part (x.sub.i) and a fractional part (x.sub.f). Fig. 4a also illustrates that the value

of X.sub.f is the distance between the intersection point (x,y) 412 and the integral point

402. The value of x.sub.f can be calculated using the floor function (represented by the

notation ".left brkt-bot. .right brkt-bot."). The floor function removes the fractional part of

a floating-point number (e.g., left brkt-bot.1.7.right brkt-bot.=1). Thus, the value of

X.sub.f can be calculated by the equation x-.left brkt-bot.x.right brkt-bot.. In addition, the

integral point 402 is at coordinate point (x.sub.i,y.sub.i), where x.sub.i =.left brkt-

bot.x.right brkt-bot. And y.sub.i=y."

It would have been obvious to one having ordinary skill in the art at the time the

invention was made to further modify the invention of Evangelisti et al. in view of

Donovan to include calculating a first and second pair of positions on lattice points of

displayed grid boxes that are located adjacent to a pair of real intersections between

each scan line and an edge of a polygon. One would have been motivated to make

such a modification to the apparatus of Evangelisti et al. so that upon performing anti-

aliasing on the bevel region surrounding the triangle, the region boundaries will be

defined by pixel locations where intensity values may be assigned to the pixels without

further anti-aliasing instead of at fractional pixel locations where further anti-aliasing

may be required to display calculated intensity values. Column 9, lines 1-38, of

Evangelisti et al. describes calculating a first initial intensity value for points on the

outside edge of the bevel, the first intersection pair, and an initial intensity value for

points on the inside edge of the bevel, the second intersection pair.

Evangelisti et al. and Donovan as applied to claims 2, 12, 44, and 54 teach of the

apparatus of claims 5, 6, 47, and 48, respectively. Column 9, lines 1-38, of Evangelisti

et al. describes generating an intensity level according to a bevel region surrounding a

triangle. Following the scanning direction of a raster device, the intensity level of the

bevel region from the outside to the inside of the region, for the first intersection pairs,

progressively increases from a zero value outside the bevel, a fractional value between

zero and one inside the bevel, and a value of one inside the bevel. Once inside the

triangle, the intensity value remains constant until reaching the second intersection pairs

lying on the bevel region downstream in the scanning direction from the first intersection

pairs. The intensity level then progressively decreases from a value of one inside the

triangle to a fractional value within the bevel to a value of zero outside the bevel area.

2.   Claims 3, 4, 13, 14, 45, 46, 55, and 56 rejected under 35 U.S.C. 103(a) as being

unpatentable over U.S. Patent No. 5,392,385 to Evangelisti et al. in view of U.S. Patent

No. 6,005,580 to Donovan as applied to claims 1, 2, 11, 12, 43, 44, 53, and 54 above,

respectively, and further in view of U.S. Patent No. 5,287,438 to Kelleher.

Evangelisti et al. and Donovan as applied to claims 1, 2, 11, 12, 43, 44, 53, and 54

teach of the apparatus of claims 3, 4, 13, 14, 45, 46, 55, and 56, respectively, except

wherein said edge calculating device calculates said first pair of outside intersection and

inside intersection arid said second pair of outside intersection and inside intersection,

based on trajectories obtained by dragging a diamond-like block between vertices of the

polygon to be drawn, said diamond-like block having vertical and horizontal dimensions

each corresponding to an interval of a display grid.

Kelleher discloses a system and method for drawing anti-aliased polygons.

Column 6, lines 5 - 20 of Kelleher, teaches of using a 4 X 4 pixel array to determine

whether pixels lie either inside or outside a half-space. Kelleher also teaches that to

evaluate a region larger than 4 X 4, the pixel array is dragged over the region, tiling it

completely. Thus, the square 4 X 4 pixel array corresponds to a diamond-like block

having vertical and horizontal dimensions each corresponding to an interval of a display

grid. Additionally, Kelleher teaches that the pixel array may be dropped around a

region. Therefore, it would have been obvious to drag the pixel array around the edge

of a polygon to create the beveled region in Evangelisti et al.

It would have been obvious to one having ordinary skill in the art at the time the

invention was made to further modify the invention of Evangelisti et al. and Donovan to

include the 4 X 4 pixel array of Kelleher. One would have been motivated to make such

a modification so that the beveled region of Evangelisti could be created in a fast and

efficient manner with a predefined width determined by the pixel array size.

3.   Claims 7, 8, 49, and 50 are rejected under 35 U.S.C. 103(a) as being

unpatentable over U.S. Patent No. 5,392,385 to Evangelisti et al. in view of U.S. Patent

No. 6,005,580 to Donovan as applied to claims 5, 6, 47, and 48 above, respectively,

and further in view of U.S. Patent No. 5,278,949 to Thayer.

Evangelisti et al. and Donovan as applied to claims 5, 6, 47, and 48 teach of the

apparatus of claims 7, 8, 49, and 50, respectively, except wherein said increasing rate is

determined based on a slope of the edge on the upstream side as viewed in the

scanning direction, and said decreasing rate is determined based on a slope of the

edge on the downstream side as viewed in the scanning direction.

Thayer discloses an invention where a polygon renderer determines the

coordinates of polygon edges to sub-pixel resolution in the x, y, and z coordinate

directions. Column 9, lines 54-59 of Thayer, describes anti-aliasing vectors based on

their slopes. "If desired, vectors may be anti-aliased via a transparency filter (not

shown) which is stored in a color-lookup table ROM in the X stepper. Such a color look-up table may be indexed by the slope of the line in the intersection of each step of the line with the minor axis." Thus, the anti-aliasing is based on the slope of the vectors.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the invention of Evangelisti and Donovan to include determining the increasing and decreasing intensity rates based on a slope of the edge of the triangle as in Thayer. One would have been motivated to make such a modification to Evangelisti and Donovan so that the intensity rate for the upstream and downstream side bevel regions can be computed quickly and efficiently with only the vertices of the triangle needed.

4.   Claims 21, 22, 63, and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,392,385 to Evangelisti et al. in view of U.S. Patent No. 6,005,580 to Donovan as applied to claims 11, 12, 53, and 54 above, respectively, and further in view of U.S. Patent No. 5,841,439 to Pose et al.

Evangelisti et al. and Donovan as applied to claims 11, 12, 53, and 54 teach of the apparatus of claims 21, 22, 63, and 64 except wherein, "when a vertex other than vertices at upper and lower ends of the polygon is located between two adjacent scan lines, said scan processing device separately performs processing based on a first distance from the upper one of the two adjacent scan lines to said vertex, and performs processing based on a second distance from the lower one of the two adjacent scan lines to said vertex, and calculates the intensity value by combining results of said

processing based on said first distance and said processing based on said second distance."

Pose et al. teaches of an invention that includes a linear interpolation filter for anti-aliasing intersection points not aligned with any one individual pixel from a display memory. Column 33, lines 40 - 50, states, "As can be seen from the drawing, the intersection point 200 is not aligned precisely with any one individual pixel from the encapsulating surface display memory, but is disposed between four adjacent pixels 202, 204, 206 and 208 (pixel 1, pixel 2, pixel 3 and pixel 4). The linear interpolation filter used herein for anti-aliasing in effect takes a weighted average of the color intensities of the adjacent pixels 202, 204, 206 and 208 on the basis of the distance from the intersection point 200 to each of the adjacent display memory pixels." When using a raster display device, an intersection point that is not aligned precisely with any one individual pixel is thus located between two adjacent scan lines. Pose discloses that processing is based on a weighted average of the distances from adjacent pixels to the intersection. Thus, it would have been obvious to use only the distances between the intersection and the two adjacent scan lines to base a weighted average for pixel processing.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the invention of Evangelist and Donovan to include anti-aliasing processing for a point or vertex point based on a weighted average of the distances from the point location and two adjacent scan lines if the point lies between two scan lines as in Pose. One would have been motivated to make such a

modification to the invention of Evangelisti and Donovan in view of Pose so that

additional methods of anti-aliasing for points not lying directly on scan lines are

available for aesthetically smoothing a polygon edge.

5.   Claims 25 - 42 and 67 - 84 are rejected under 35 U.S.C. 103(a) as being

unpatentable over U.S. Patent No. 5,392,385 to Evangelisti et al. in view of U.S. Patent

No. 6,005,580 to Donovan, as applied to claims 1, 11, 43, and 53, and Japanese Laid-

open Patent Publication (Kokai) No. 07-105390 to Ikumi et al.

Evangelisti et al. and Donovan as applied to claims 1, 11, 43, and 53 teach of the

invention of claims 25, 28, 37, 67, 70, and 79 except wherein a polygon is drawn by

combining a plurality of triangles and a control bit indicates whether each edge of each

of the triangles is to be drawn.

The invention of Ikumi discloses a polygon drawing method that divides a polygon

into a plurality of triangles so as to draw the polygon. Ikumi includes an identification

flag that indicates whether an outside line corresponding to a pair of adjacent

coordinates of vertices is a border line or a division line, and drawing only outside lines

corresponding to ones of the coordinates of vertices that are indicated by the

identification flag to correspond to the border lines.

It would have been obvious to one having ordinary skill in the art the time the

invention was made to modify the invention of Evangelisti and Donovan to include

drawing a polygon by combining a plurality of triangles. One would have been

motivated to make such a modification to the invention of Evangelisti so that the

drawing of a complex polygon shape can be done using a conglomeration of simple triangle shapes. It would have also been obvious to one having ordinary skill in the art at the time the invention was made to further modify the invention of Evangelisti and Donovan to include a control bit to determine whether or not to draw an edge of a triangle. One would have been motivated to make such a modification to the invention of Evangelisti and Donovan so that upon drawing a triangle wherein one of the edges does not need to be drawn, resources and time are saved by not drawing the edge. Additionally, an intensity value for an edge of a triangle can be determined by the control bit in that if there is no edge to be drawn then the edge can be assumed to have no intensity value.

Evangelisti et al. and Donovan as applied to claims 1, 11, 43, and 53 teach of the invention of claims 26, 29, 35, 38, 68, 71, 77, and 80 except wherein a polygon is drawn by combining a plurality of triangles and a control bit indicates whether intensity processing is to be performed on each edge of each of the triangles. The invention of Ikumi discloses a polygon drawing method that divides a polygon into a plurality of triangles so as to draw the polygon. It would have been obvious to one having ordinary skill in the art the time the invention was made to modify the invention of Evangelisti and Donovan to include drawing a polygon by combining a plurality of triangles. One would have been motivated to make such a modification to the invention of Evangelisti so that the drawing of a complex polygon shape can be done using a conglomeration of simple triangle shapes. The invention of Donovan teaches of using a control flag to identify which polygon edges should be anti-aliased. Column 7, lines 3 - 9 of Donovan, states,

"As another example, the processor 105, executing the graphics application 135, could

provide to the graphics card 125 both data describing the set of polygons representing

the image and data describing/identifying which polygon edges are to be anti-aliased in

step 210 (e.g., flags could be stored in the data identifying which polygon edges should

be anti-aliased)." It would have been obvious to one having ordinary skill in the art at

the time the invention was made to further modify the invention of Evangelisti et al. and

Donovan to include a control flag to identify which edges of the triangles should be anti-

aliased. One would have been motivated to make such a modification to Evangelisti

and Donovan so that system time and resources are saved by not performing intensity

operations, anti-aliasing, on an edge of a triangle when it is not preferred.

Evangelisti et al. and Donovan as applied to claims 1, 11, 43, and 53 teach of the

invention of claims 27, 30, 36, 39, 42, 69, 72, 78, 81, and 84 except wherein a polygon

is drawn by combining a plurality of triangles and a first and a second control bit

indicates whether each edge of each of the triangles is to be drawn and whether

intensity processing is to be performed on each edge of each of the triangles,

respectively. The invention of Ikumi discloses a polygon drawing method that divides a

polygon into a plurality of triangles so as to draw the polygon. Ikumi includes an

identification flag that indicates whether an outside line corresponding to a pair of

adjacent coordinates of vertices is a border line or a division line, and drawing only

outside lines corresponding to ones of the coordinates of vertices that are indicated by

the identification flag to correspond to the border lines. It would have been obvious to

one having ordinary skill in the art the time the invention was made to modify the

invention of Evangelisti and Donovan to include drawing a polygon by combining a plurality of triangles. One would have been motivated to make such a modification to the invention of Evangelisti so that the drawing of a complex polygon shape can be done using a conglomeration of simple triangle shapes. It would have also been obvious to one having ordinary skill in the art at the time the invention was made to further modify the invention of Evangelisti and Donovan to include a control bit to determine whether or not to draw an edge of a triangle. One would have been motivated to make such a modification to the invention of Evangelisti and Donovan so that upon drawing a triangle wherein one of the edges does not need to be drawn, resources and time are saved by not drawing the edge. Additionally, an intensity value for an edge of a triangle can be determined by the control bit in that if there is no edge to be drawn then the edge can be assumed to have no intensity value. The invention of Donovan teaches of using a control flag to identify which polygon edges should be anti-aliased. Column 7, lines 3-9 of Donovan, states, "As another example, the processor 105, executing the graphics application 135, could provide to the graphics card 125 both data describing the set of polygons representing the image and data describing/identifying which polygon edges are to be anti-aliased in step 210 (e.g., flags could be stored in the data identifying which polygon edges should be anti-aliased)." It would have been obvious to one having ordinary skill in the ad at the time the invention was made to further modify the invention of Evangelisti et al. and Donovan to include a control flag to identify which edges of the triangles should be anti-aliased. One would have been motivated to make such a modification to Evangelisti and Donovan so that

system time and resources are saved by not performing intensity operations, anti-

aliasing, on an edge of a triangle when it is not preferred.

Evangelisti et al. and Donovan as applied to claims 28, 29, 30, 70, 71, and 72 teach

of the invention of claims 31, 32, 33, 34, 40, 41, 73, 74, 75, 76, 82, and 83. Figure 17 of

Evangelisti shows the computation of new pixel values with regard to an anti-aliasing

factor, intensity value. The new pixel values are determined by a ratio of an intensity

value of a pixel that is to be drawn to an intensity value of a pixel that is originally

located at the position where the pixel to be drawn exists. Evangelisti in view of

Donovan includes a control bit to indicate whether an edge of a triangle is to be drawn

or not. Evangelisti teaches that a point lying outside the bevel region and the triangle

will have an anti-aliasing factor of 0. If an edge of a triangle is not to be drawn then that

edge is considered to be outside the triangle region. Thus, when the control bit

indicated that an edge of a triangle is not to be drawn, the intensity value of the pixel to

be drawn is set to 0. Also, it is obvious to one having ordinary skill in the art that it is

merely a matter of design choice to set the intensity value of a pixel to either a 0 or a 1

when an edge containing the pixel is not to be drawn or will not have intensity

processing performed.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Michelle K. Lay whose telephone number is (571) 272-

7661. The examiner can normally be reached on Monday - Friday, 7:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Michael Razavi can be reached on (571) 272-7664. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

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10.13.2005 mkl

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